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Abstract

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This monograph on military theory examines the subject of fire support effectiveness and responsiveness. In 1987 the fire support effectiveness rate as measured by the Army's Combat Training Centers was 60%. Despite the Army's effort to improve its ability to fight with fires, the effectiveness rate as of February, 2000, had declined to 12%. This factual evidence complements the perceptions of senior Army leaders who criticize the fire support community for failing to provide the supported maneuver formation with responsiveness fire support.

The examination of theory explains how the Army's centralized control of fires to facilitate massing of fires, coupled with a poorly developed digital fire control system are the root causes of failure. Theory is further used to predict the role of fires in the future and shows that centralized control works directly against the Army's focus on high tempo, decisive maneuver operations.

This document aims to change the Army view's on how it controls and fights with indirect fires at the brigade level and below. In essence, a shift from centralized control to decentralized control would improve both effectiveness and responsiveness while also setting into motion establishment of a foundation from which to support 21st Century Warfare.

Fighting With Fires: Decentralize Control to Increase Responsiveness

**A Monograph
by
Lieutenant Colonel Robert C. Johnson
U.S. Army**



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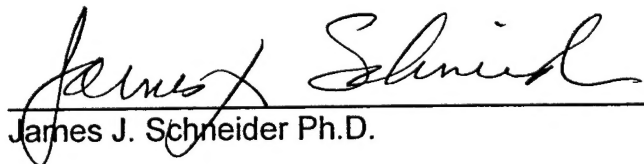
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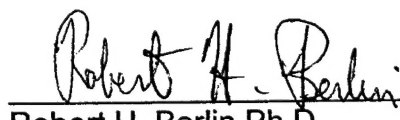
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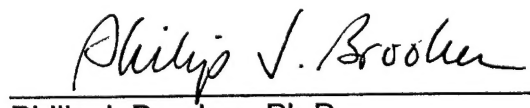
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FIGHTING WITH FIRES: DECENTRALIZE CONTROL TO INCREASE RESPONSIVENESS

CHAPTER ONE

INTRODUCTION

Army doctrine says that "the successful delivery of fire depends on the synchronization of all forms of fire support assets alongside the maneuver, engineer, logistics, electronic warfare, air defense artillery, and intelligence plans for one purpose.¹ That purpose is to place the correct type and volume of fire at the right time and on the right target to ensure the success of the combined arm's commander's plan. Accomplishment of this purpose is the essence of "fighting with fires."² Development of the collective skills to fight with fires requires training.

Battle focused training on combat tasks prepares soldiers, units, and leaders to fight and win the nation's wars. Training is the cornerstone of success. It is a full-time job for commanders in peacetime and it continues while deployed in full spectrum operations as well.³ Training to achieve and then sustain high standards is essential for a full spectrum force. Every leader, soldier, and unit in a strategically responsive Army must be trained to ready to deploy, fight, and win.⁴

All training is based on the principle of "train as you fight" which means that units should train in peacetime as they will fight during war.⁵ Therefore, a prime mandate for leaders at every level is to make peacetime training most closely as possible approximate battlefield conditions in order to prepare soldiers for the complex, stressful, and lethal situations they can expect in war.⁶

The degree to which a commander is able to achieve realism in his training is in large measure a reflection of the resources available to him. Usually, Army units are constrained to achieving a level of realism short of that encountered at the Combat Training Centers (CTCs).⁷ In a spectrum of realism ranging from "thinking about the

task," all the way up to and including "real combat," the CTCs provide the most realistic training available to prepare leaders, soldiers, and units for war just short of real combat.⁸

The Army has three maneuver CTCs. Each of the CTCs offers an extraordinary opportunity for units and their leaders to train at a level normally not available to them at their home-stations. They offer large maneuver areas and opportunities to train on mission-essential tasks and wartime missions against an opposing force under realistic and demanding conditions. They also provide sophisticated systems that provide real-time assessments of the unit's performance as they proceed through the exercise.

The Army's four stated objectives for establishing the CTCs were to: first, increase unit readiness; second, produce bold, innovative leaders; third, imbed doctrine throughout the Army; and lastly, provide data for improving doctrine, training, leader development, organizations, and materiel.⁹ To achieve these objectives, the CTCs were designed to create a realistic training environment, challenge unit leaders with missions against a well-trained opposing force, and provide in-depth analysis of performance to units and their leaders.

Since their inception, the CTCs have collected and analyzed performance data for publication in the form of positive and negative trends. A common negative trend has been the inability of the fire support system to effectively support combined arms maneuver. That is, an inability to fight with fires.¹⁰

Solving this problem is important for two reasons. First, a solution contributes materially to the Army's ability to dominate land warfare across the full spectrum of operations. In the next war the Army will fact be a "come-as-you-are" Army. Meaning, the Army will not have the benefit of a Desert Shield like experience to allow for full mobilization or training ramp-up before commitment into battle. The central component

to achieving land dominance in full spectrum operations is the generation and application of combat power. Of which, firepower, is a key element.

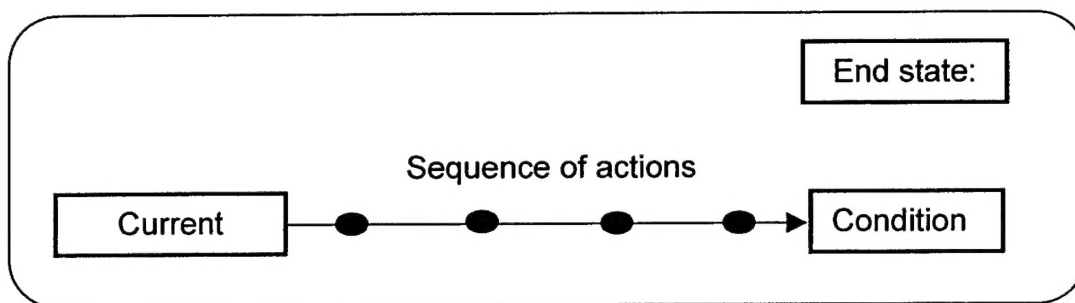
Second, success in current and future symmetrical or asymmetrical battle results from a number of different activities that coalesce within a relatively short period of time. One of the most crucial elements influencing the outcome of battle at the tactical level is the tempo and quality at which a unit plans, controls, integrates, synchronizes, and executes indirect fires to support the movement of its maneuver forces to a position of advantage. The rate at which a unit must move and strike must exceed the capability of the enemy force to recover and counter. This requires highly mobile, lethal maneuver formations linked to responsive, precise indirect fire systems.

There are at least two ways to solve the problem. First is a management approach that concerns itself with getting to the bottom line: How can the Army best solve this problem? Another way to solve the problem is through leadership which deals with the top line focus: What are the things the Army wants to accomplish?¹¹ The approach for use here is the latter, identifying the things the Army wants to accomplish as the start point from which to develop a solution. To do this requires vision, for as it says in the book of Proverbs, "where there is no vision, the people perish."

Vision creates focus. At least one person must have a vision before other people begin to see it. "Only when someone possesses, sharpens and augments the vision can it take a shape that others can see, accept, promote, and work to achieve."¹²

Visualization is both an art and a science that consists of three aspects: broad definition of the desired future state (end-state); consideration of the current situation (current state); assessment of the differences and envisioning of the sequence of actions (objectives) needed to link the two.¹³ Figure 1-1 depicts the visualization process. Visualization is a backwards-planning process that begins with determination of the end state. The end state is what the future should be at the end of an endeavor.

Figure 1-1. Visualization



Examination of the end state defines the conditions that when met collectively achieve the end state. The second step is to gain an appreciation for the current state. By comparing the current state to the future state, differences, or the "delta," emerge. This leads to the third step. Unified through the logic of purpose (cause and effect), objectives are sequentially linked to actions that when completed create the conditions that collectively establish the end state.

The purpose of this monograph is to answer the research question: can the Army improve its ability to "fight with fires?" That is, can the Army improve its ability to place the correct type and volume of fire at the right time and on the right target to ensure success of the combined arms commander's plan?¹⁴

The aim of this monograph is simple: to change the Army's view on how it controls and fights with indirect fires at the brigade level and below. To reach this aim, Chapter 2, Theory, looks at the process of destruction, battlefield expansion, and the interrelationship between fire and maneuver. The objective is to explain why both the past, current, and future states are the way they are (or will be). Also, the theories discussed here provide the foundation from which to examine the remainder of the document.

Chapter 3, Future Warfare, builds on the theoretical foundation laid in Chapter 2 by identifying the key aspects of future warfare. This chapter discusses what the Army needs in order to adapt to combat on future battlefields.

Chapter 4, Current Situation, looks at both CTC performance trends and senior Army leader perceptions to frame the argument on the condition of the force. Next, the chapter addresses the U.S. Army Field Artillery School's proposed solutions. This chapter closes with a discussion which summarizes the "delta" between where the Army wants to go and where it is.

Chapter 5, Conclusion and Recommendations, unifies through the logic of purpose a series of actions that offer solutions to the existing problem while at the same time creating the conditions for a better posture to transition to the future.

In summary, the monograph describes the future warfare environment in order to define the desired end state and to examine facts and perceptions to describe the current situation and to define the problem. Next, the monograph uses military theory to develop a solution. Conclusion, the final section, summarizes the major points of the monograph, proposes several solutions and then closes with implications from adoption of the solution.

CHAPTER TWO

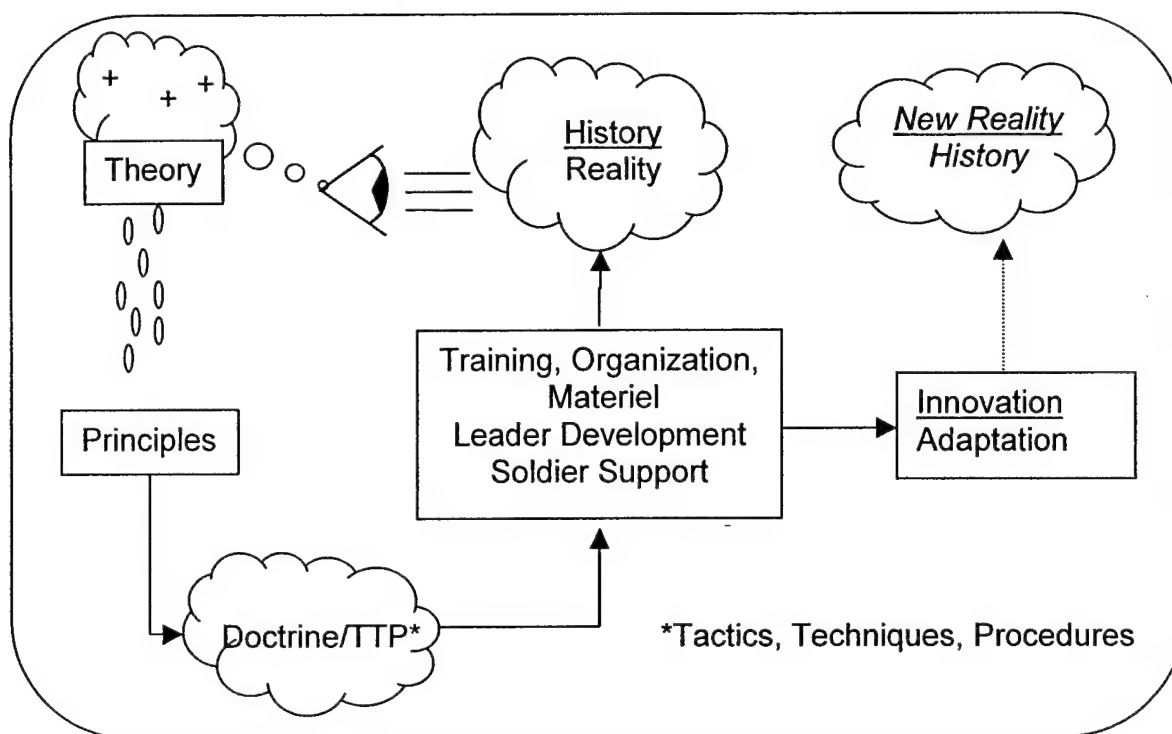
THEORY

Before going on to discussing Future Warfare, it is necessary to establish the linkage between history, theory, and doctrine and to establish the theoretical underpinnings which together serve as the means to examine the dynamics contributing to the problem. This baseline understanding is necessary to place into perspective the remainder of the monograph.

For military theory to be of any value it must explain the past as a means to predict the future.¹⁵ To explain the past, theory catalogs events, organizes and describes them, simplifies the data, and establishes causal relationships.¹⁶ This does not mean that theory accounts for every factor relative to phenomena. What it does mean is that theory can account for enough factors to develop a cogent argument, which if valid, will stand until either disproved or replaced by another theory. Therefore, the predictive nature of theory is determined by the degree in which a theory retains its validity while also being useful as a basis to develop a plan of action. The practical use of theory is explainable through its relationship with doctrine as shown in Figure 2-1.

The theorist looks at the past and to the current day as the start point to explain phenomena. Culture, education, experience, maturity, and innumerable other conscious and subconscious factors play in the theory development process. Through the process of distillation the theorist reduces his theory to a set of principles, which in turn serve as the basis for doctrine development. Doctrine, or more aptly military doctrine, is the practical application of theory. Within an organization, doctrine is authoritative and serves as a guide for the development of weapons and equipment, the organization and administration of armies, and the training of soldiers and leaders.¹⁷ As changes in the environment occur or through the process of experimentation, the way an organization applies doctrine evolves either through the process of innovation or adaptation which

Figure 2-1. Relationship Between History, Theory & Doctrine



then affects the environment as a whole to create a new reality. The theory development process begins anew with the "new reality" which is compared to existing theory. If existing theory retains its validity and can explain phenomena in the new reality then the theory stands. If the theory does not hold, then a new theory must be developed. The utility of theory and doctrine for the military is that theory is useful in solving new problems and aiding in the development of future doctrine while doctrine provides the basis for unity of effort.¹⁸

To account for the past and to predict the future there are several theories which have value to interpret the chapters which follow.

Process of Destruction and The Empty Battlefield

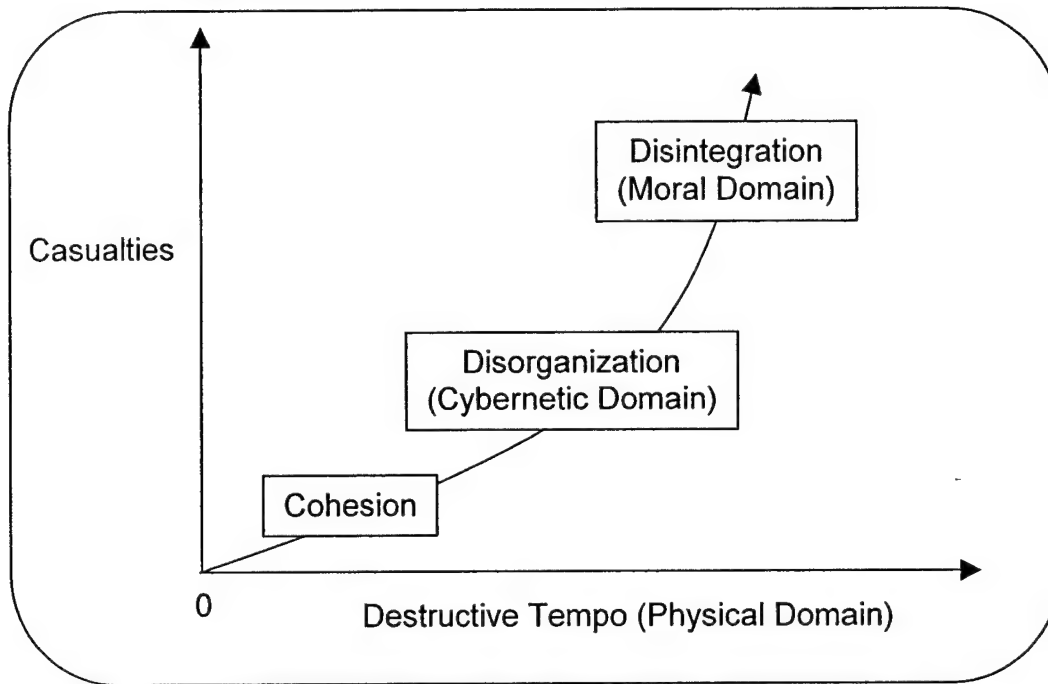
Theory is a means to discuss the process that results in the disintegration of the human will in battle. Human will is the "desire to act." The military force that is incapable of continuing the fight due to the process of destruction can be considered as

having lost its will. By gaining an appreciation of the factors working against sustainment of will, one is better able to understand the foundations of Army doctrine.

Clausewitz wrote "military activity is never directed against material forces alone; it is always aimed simultaneously at the moral forces which give it life, and the two cannot be separated." He regarded the principal moral elements to be the "skill of the commander, the experience and courage of the troops, and their patriotic spirit." He concluded, "in the engagement, the loss of morale has proved the major decisive factor."¹⁹ Since his time, other military theorists, including Ardant du Picq, Lord Moran, S. L. A. Marshall and Anthony Kellett, have written about the role of man in battle and the effects of battle upon man. In an era of highly lethal technology for waging war, the moral element of combat remains decisive inasmuch as combat remains a clash of wills.

Dr. James J. Schneider, a Professor of Military Theory at the School of Advanced Military Studies at the U.S. Army's Command and General Staff College, Fort Leavenworth, Kansas, uses the metaphor of lead transforming from a solid state of cohesion, to a liquid state of disorganization, and finally to a gaseous state of disintegration to illustrate the processes leading to the destruction of the human will. Dr. Schneider describes this process using the physical, cybernetic, and moral domains. The "Physical Domain" concerns the entire process of destruction: the effects of weapons, munitions, terrain, weather, logistics, and other physical factors. The "Cybernetic Domain" concerns the processes of organization, command, control, communications, computers, information flow, and human systems. The "Moral Domain" concerns the disintegration and breakdown of will, inspiring, sustaining, and revitalizing trust and morale.²⁰ He uses the model at Figure 2-2 to illustrate the relationship between these elements, the rate of destruction, and casualty rates.²¹

Figure 2-2. Destruction, Disorganization, Disintegration



In Dr. Schneider's model above, a unit entering combat is a solid, cohesive force. Over time, the process of destruction, especially the tempo of destruction, exerts an influence that begins to transform the unit's nature. Casualty rates increase and unit cohesiveness decreases due to the destructive process. At this point the destructive process has started to change the unit from a solid to a liquid, a cohesive organization to a disorganized organization. The loss of cohesion impacts on command, control, communications, and intelligence functions. These functions provide the means to keep the unit organized. As these functions erode further, the unit moves from the liquid to the gaseous state, from being a disorganized unit to a disintegrated unit. The total breakdown of cohesion and organization result in disintegration which is the gaseous state. To deal with the phenomena of destruction, several military theorists have written about the destructive process and the effect it has on the sustainment of will.

The Physical Domain

Trevor N. Dupuy, a U. S. Army officer and military theorist of the Twentieth century, wrote on the effects of weapons and munitions as elements of destruction. Dupuy developed the Theoretical Lethality Index to provide a means of measuring the relative effectiveness of weapons based on such things as range, rate of fire, accuracy, reliability, and rate of damage, etc.²² According to Dupuy, increases in lethality make dispersion a requirement for survival. Looking back at history to develop his theory, Dupuy posited that fires, shock action, or a combination of the two, are the primary means of destruction. To obtain the maximum effect from these means required concentrating the maximum number of forces in a small area. This requirement led to the development of close-order formations such as the phalanx.²³ As advances in technology made weapons and munitions more lethal, close-order formations became obsolete. Survival therefore became more dependant on dispersion.²⁴ As dispersion increased, cohesion decreased.

Ardant du Picq, a French Army officer and military theorist of the nineteenth century, wrote on the importance of cohesion as the means to control the soldier's instinct for self-preservation.²⁵ He argued that individually, man will go to great lengths to kill without being killed and that the individual strength that allows the soldier to kill comes from the perception that he is stronger than his enemy.²⁶ Should the soldier believe that the enemy is superior, the internal stresses of standing in the face of danger exert such an influence that the soldier feels compelled to flee. The force that urges the soldier to flee is his instinct for self-preservation.²⁷ Du Picq believed that discipline and organization are the solutions to this problem:

"This is the reason for tactics which prescribe beforehand proper means of organization and action to give unanimity to effort, and for discipline which insures united efforts in spite of the innate weakness of the combatants."²⁸

The effects of weapons and munitions mandate the need for dispersion as a means for survival. The loss of cohesion created by dispersing complicates the leadership challenge. The leadership challenge of sustaining the will to fight through retention of cohesive organizations becomes more difficult when one factors in the effects from terrain and weather.

Terrain and weather reduce unit cohesion by impacting primarily on movement, intervisibility, and engageability. Within the phalanx soldiers could see and touch their comrades and their enemies. Increases in weapons lethality and the resultant dispersion made it more difficult for the soldier to remain in contact with his comrades and the enemy. Dispersion reduces cohesion by isolating the soldier. Dispersion also increases uncertainty, as the soldier no longer sustains visual or physical contact with his enemy. Conditions of isolation and uncertainty increase the soldier's difficulty in coping with his instinct for self-preservation.

Tactical leaders had less trouble in commanding and controlling close-order formations. Close-order formations allowed the unit to remain cohesive despite the battlefield conditions. The effects from improved weapons, more destructive munitions, and weather as elements of the destructive process reduced cohesion by creating the requirement for dispersion as a means for survival. Elimination of the close-order formation increased the difficulty for a force to remain cohesive. Elimination of the close-order formation also complicated the leader's ability to execute command and control functions.

In short, improvements in weapon and munitions lethality made the destructive process more effective. Adjustments to the increased effectiveness of the destructive process included increased dispersion and elimination of close-order formations. Increased dispersion meant decreased cohesion. Decreased cohesion meant increased command and control problems.

The Cybernetic Domain

According to Dr. Schneider's model, the physical domain is primarily concerned with weapon systems and their destructive effect. The cybernetic domain is concerned with the effects of disorder that result from the physical process of destruction.

Martin van Creveld, a Professor of History at the Hebrew University in Jerusalem, wrote in 1985 on the historical evolution of the command, control, and communications (C³) function.²⁹ He believes that C³ functions have remained unchanged throughout the history of warfare.³⁰ However, van Creveld does admit that the manner in which contemporary leaders execute these functions has grown in complexity.³¹ Essentially, the change was a shift from a single leader's ability to control a close-order formation in ancient times to that of a commander and large staff in the Post-Industrial Revolutionary period. Dispersion was one of the key causes for change.

Improved weapons lethality made dispersion a requirement for survival. Dispersion required commanders to develop processes by which they could command and control their distributed forces. Part of this solution was organizational. Commanders began to organize their units for decentralized operations. An increase in decentralization also meant an increase in the amount of uncertainty to which the commander, his soldiers, and his units became subject.

The degree to which a leader can reduce uncertainty impacts directly on sustainment of the will to fight. When fighting from a close-order formation, a soldier could see his enemy. Being able to see the enemy allowed the soldier to derive a certain degree of comfort. The leadership challenge in employing the close-order formation centered on keeping the unit aligned in its combat configuration. Under these conditions, cohesion was the factor that helped soldiers and units sustain the will to fight. In modern war dispersed units must not only find the enemy, but also remain in contact with other friendly units, neither of which are they usually able to see. Cohesion is one

of the factors that help sustain the will to fight under these conditions. However, there are other elements that a leader must consider.

S. L. A. Marshall, U. S. Army officer and military historian, wrote in 1947 on the human dimension of warfare as the central element holding the cybernetic domain together. Marshall notes that victory in battle is the result of numerous smaller victories found in the engagement and that success in the engagement comes from the application of massed firepower (small arms fire primarily) at the decisive point.³² The essence of his argument is that success in battle is the result of numerous smaller distributed actions. Therefore, success on the distributed battlefield depends on the effectiveness and cohesion of numerous small elements.

Increased unit dispersion caused a shift in the way tactical leaders executed their command and control functions. The new command and control process had to be capable of performing three functions: controlling decentralized units; reducing uncertainty; and focusing the action of multiple distributed units. Small unit cohesion, and more importantly, self-discipline of the individual soldier are essential to making the new command and control system work. Therefore, the tactical leader must understand how the process of destruction impacts on individual self-discipline and sustainment of the will to fight.

The Moral Domain

The preceding discussions within the cybernetic and physical domains have focused on how the physical process of destruction affects cohesion and disintegration. The moral domain extends the examination by discussing the physical process of destruction and its impact at the individual level. In particular, the moral domain focuses on the battlefield dimension intimately linked to human performance.

Lord Moran, a British Army Officer, surgeon, and military theorist, wrote in 1945 on the effects of war on man and on how courage (will) is born and sustained.³³ He suggests that the battlefield environment wears down an individual's capacity to act.³⁴ To illustrate his argument, Moran uses a bank account metaphor. Before entering combat every person has a certain amount of will in his "bank account." The individual makes periodic "withdrawals" from his account to sustain himself in combat. Moran believes that anger, boredom, individual character, casualties, displays of courage, fatigue, fear, and stress are some of the factors that require an individual to make a withdrawal.³⁵ Each of these emotional responses and the degree to which they are displayed tie to the battlefield environment. Eventually, if the individual remains in combat long enough, he will diminish his account to a zero balance. Upon achieving a zero-balance, the individual is no longer effective. Moran also suggests that an individual can have his account replenished. In Moran's view, the quality of the soldier's leaders, the soldier's ideology, the presence of unit esprit de corps, the strength of unit discipline, and most importantly, the soldier's relationships with other soldiers (comraderie) are the means to replenish the individual soldier's account.³⁶ Moran is arguing that although individual attributes are important in an individual's performance, ultimately the individual must rely on other soldiers to sustain an acceptable level of performance. In support of Moran's argument, other theorists offer the following views.

S. L. A. Marshall looks at individual performance in much the same light.³⁷ Marshall believes that the primary group is the key to a soldier's maintaining an acceptable level of performance in combat.³⁸ Marshall also discusses the impact that feelings of isolation have on the individual soldier and points to the role of the primary group in providing the support necessary for the soldier to cope with this problem. Another military theorist, Anthony Kellett, supports the work of both Lord Moran and S. L. A. Marshall.

Anthony Kellett, a Canadian soldier and military theorist, published a multidimensional study in 1982 on the same problem that both Moran and Marshall address.³⁹ Instead of focusing on either the individual or the group, Kellett takes a holistic approach. His contribution is the connection he draws between the role of the primary group and the "identity" provided to the group from the greater organization. There is a reciprocal relationship between the individual, group, and organization.

Each, through demonstrated behavior, ensures the survival of the other.⁴⁰ From a leader's perspective, there are two problems in depending on primary groups in this type of relationship. Primary groups do not regenerate themselves without external assistance. Also, primary groups are less effective when the primary groups have a different identity or purpose than that of the greater organization. In short, the contribution Moran, Marshall, and Kellett make is identifying the primary group, as the key to sustaining the individual will to fight. Therefore, the task for the tactical leader is twofold. The tactical leader must develop primary groups. Once he has formed primary groups, the tactical leader must then focus the behavior of the primary groups toward accomplishment of objectives that support the organization.

In Dr. Schneider's model the casualty measurement along the "Y" axis represents individuals, groups, and organizations. Therefore, the destructive process itself is the cause of the loss of the will to fight. The destructive process is an unchangeable battlefield condition. The leadership task under unchangeable battlefield conditions is to create, sustain, and regenerate primary groups as the means to maintain the will to fight. Since individuals make-up groups, the leadership process must take this into consideration.

To briefly review, as weapon systems and their effects became more lethal the destructive process became more effective. In response to the dynamic described by the physical domain, organizations became smaller, increased their dispersion between

one another and suffered a loss in organizational cohesiveness. To mitigate against the loss of cohesion, the increase in decentralization, and to focus the action of distributed forces organizations improved their C³ processes and organization design.

Further, an Army seeking to defeat the other had to follow suit. That is, it too improved its weapons and munitions effectiveness, dispersed its formations, improved its C³ and organizational structures, and also sought to gain advantage. The effects of fires coupled with the use of maneuver is one means by which formations attempted to generate greater combat power at the point of decision as noted in the discussion below

Fire and Maneuver

Samuel B. Griffith's translation of Sun Tzu's "The Art of War" compares the *cheng* and *ch'i* as two interlocked rings: "who can tell where one begins and the other ends?"⁴¹ The normal, direct or *cheng* force and the extraordinary, indirect, or *ch'i* force are reciprocal, their effects are mutually reproductive. The *Cheng* is the fixing element and *ch'i* the flanking or encircling element. They are the force(s) of distraction and the force(s) of decision. "Their possible permutations are infinite; the *cheng* effort may be transformed into a *ch'i*, a *ch'i*, into a *cheng*. The same thing can be said of the relationship between fire and maneuver.

General Richard Cavazos, making the same point as Sun Tzu, once said "one of these days I'm gonna get you guys briefing fires and maneuver in the same breath."⁴² While Sun Tzu talked broadly about the complementary nature of two interrelated forces, General Cavazos's talks specifically about the complementary nature of two interrelated forces. Both men would agree that without one of the elements, the other would not exist. A closer look at the relationship between fire and maneuver provides the theoretical foundation to define the proper role of fire support.

Field Manual 7-8, *Infantry Rifle Platoon and Squad*, and along with the 1987 *III Corps Maneuver Booklet*, provide the clearest discussions on the topic one could hope to find.⁴³ Maneuver is the tactical movement of forces supported by fires which is conducted to achieve a position of advantage from which to destroy or threaten destruction of an enemy force.⁴⁴ The attacking force maneuvers to attack enemy flanks, rear areas, logistics areas, and command posts. In the defense, friendly forces maneuver to counterattack the enemy's flank. Maneuver, when properly supported by fires, allows the friendly force to close with the enemy and gain a decision.

Firepower is the capacity of a unit to deliver effective fires on a specific target.⁴⁵ Fires delivered directly and/or indirectly suppress the enemy, deceive the enemy, and supports maneuver. Before attempting to maneuver, friendly units must establish a base of fire. A base of fire is placed on the enemy force or position to reduce or eliminate the enemy's ability to interfere with friendly forces.

Maneuvering forces always have the ability to support themselves with either with direct and/or indirect fires. The "fire and maneuver" of Army doctrine differentiates between units committed to supporting operations by fire alone and the attacking forces that close with and destroy the enemy.⁴⁶ "Fire and movement," refers to the use of part of the attack force to fix or suppress an enemy unit with direct fires while the remainder of the attack force continues to advance.

Fire and maneuver is the cooperation between the base of fire and the attack force. The base of fire suppresses and destroys enemy forces in position to engage the attack force while the attack force moves against the enemy. The attack force maneuvers over covered routes to destroy the enemy with direct fire or to bypass him.

The base of fire consists of fire support units that do not close with the enemy or participate in the direct fire battle.⁴⁷ Fire support operations are uniquely fast and

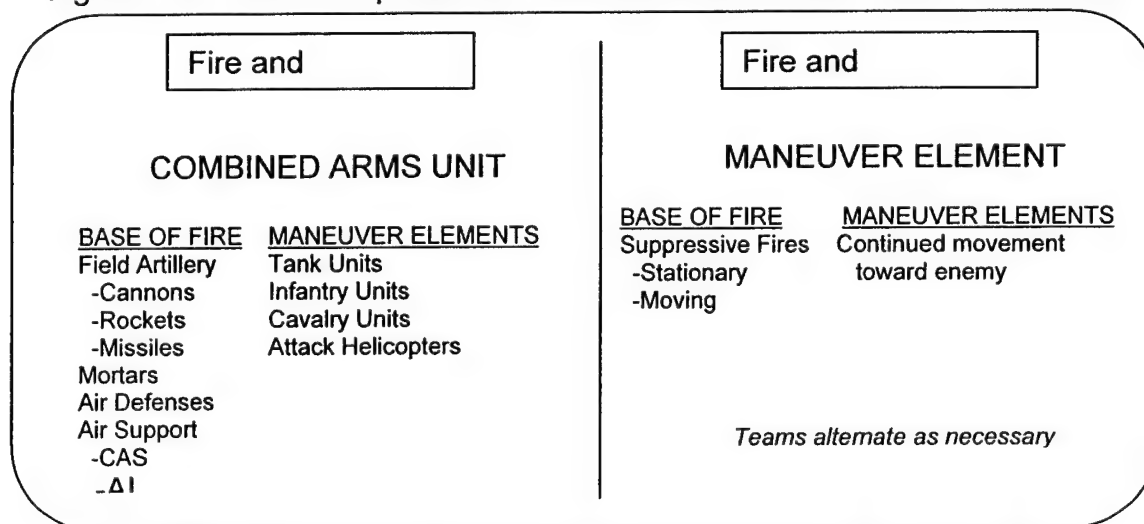
flexible; the base of fire for an attacking force can be massively reinforced without significant redeployment of forces.

The attack force is a ground or attack helicopter unit with the mission of defeating a targeted enemy force or occupying an objective. Armor, mechanized infantry, infantry, attack helicopter or cavalry units are all attack forces.

Ideally, an attack force moves continuously in mass. It moves directly into contact with the enemy using base of fire to support its movement and to assist it in destroying the enemy force. The attack force halts only when it meets effective resistance or when it gains the positions necessary to destroy the targeted enemy force.

When the base of fire cannot eliminate resistance, the attack force employs fire and movement. One part of the attack force suppresses enemy fires to permit the remainder to continue to move. In the Army's heavy forces, stabilized gunfire makes fire and movement possible without halting in some cases. When the attack force receives effective anti-armor fire, it usually divides into two elements and alternates movement between them.⁴⁸ The moving element advances to a protected firing position supported by over watching fire from the other part of the attack force. It then supports movement

Figure 2-3. Relationship Between Fire And Maneuver & Fire And Movement



of the other element and the alternation continues until both parts of the attack force are close enough to their objectives to assault it. Figure 2-3 illustrates these relationships.

In combined arms formations, part of the force is generally used to as the fixing element while the other part of the force attacks (*cheng and ch'i*). The role of the fixing element is to stop the enemy, prevent him from moving, and force him to fight. The remainder of the force assaults, or penetrates the fixed enemy force.

The cooperation of fixing forces and attack force is one of the chief characteristics of mobile warfare.⁴⁹ Freedom of action and exercise of the initiative—two key aspects of maneuver warfare—are preserved by this division of responsibilities. It is one of the best ways to make the enemy fight in two directions at once or for gaining access to undefended areas.⁵⁰

The idea of fixing and attack forces not only extends to corps and army operations, but also reaches into operational or theater level maneuver. At that level enemy forces are fixed with major land operations or air campaigns while other forces use ground maneuver, air assault, or amphibious landings to occupy key terrain in the theater or to entrap the immobilized enemy force.

In brief, fire and maneuver refers to the combined arms formation's employment of direct and indirect fires of the force as a whole to attain a position of advantage. Fire and movement is particular to the maneuver formation and pertains to its use of organic direct fire weapons to facilitate the movement of one part of the force supported by the other. The distinction is significant for defining the role of fire support on the battlefield. Given that fire and maneuver is the chief means by which a combined arms formation will attain a position of advantage from which to close with the enemy and obtain a decision, then it stands to reason that like *the cheng* and *ch'i* these are two inseparable forces.

The process of destruction coupled with the related theory of the empty battlefield explain the past and show the value of fire and maneuver as the means to adjust to the expanded battlefield conditions explained by the physical, cybernetic and moral domains. These theories are also predictive.

CHAPTER THREE

FUTURE WARFARE

The purpose of this chapter is to describe what the Army needs in its future forces. Building on the previously discussed theories, this chapter briefly discusses the battlefield environment of the future.

A couple of points need to be made before going further. The first is that of time. In terms of time, the "future," at least for discussion purposes, consists of two time periods. The short term is from now until the year 2015. The long term is the year 2015 and beyond. This time horizon corresponds to what Army Chief of Staff, General Eric K. Shinseki, laid out in the Army Transformation Vision.⁵¹ The significance of time in this discussion is that the actions taken now will impact on what the future looks like or as futurist John Schaar says: "the future is not some place we are going to, but one we are creating."⁵² It is those actions the U.S. takes in the short term that will ultimately shape the long term.

As the discussion will show, in the end, it is not how the Army leverage's information or technology that make a difference, it is about how the Army thinks about the future and postures itself now that will make a difference. The bottom line is the degree to which the Army achieves a balance between firepower and maneuver will determine its success on the future battlefield.

The Size, Shape and Pattern of the Future Battlefield

The conceptual template described in the U.S. military Joint Vision documents captures in broad terms the direction of future war.⁵³ Joint Vision 2020 extends the concepts laid out in Joint Vision 2010 to guide the continuing transformation of America's Armed forces.⁵⁴ The overall objective of transformation is to create a force with the capability to dominate an opponent across the range of military operations in war and

military operations other than war—full spectrum dominance.⁵⁵ U.S. forces in the future will be faster, more lethal, and more precise in 2020 than it they are today.⁵⁶ The strategic concepts of decisive force, power projection, overseas presence, and strategic agility, guide the employment of U.S. forces. Advances in information technology provide the architecture from which to exploit four operational concepts: dominant maneuver, precision engagement, full dimensional protection, and focused logistics.⁵⁷

These concepts represents an important step toward the objective of achieving the right capabilities for the challenges the U.S. will face in the 21st Century. The quickest and most descriptive way to describe what the U.S wants is to use the term “Joint Blitzkrieg.” Blitzkrieg is definitely the right term to capture what is needed in future war.

The view here is that the faster that the joint can respond to a crisis, the faster it can be resolved. A rapid response by integrated joint forces can have a greater or equally significant impact on crisis resolution as a larger operational capability built up over a longer period of time. Strategic responsiveness will be key to employment of U.S. forces in the future.

One situation the Army needs to be prepared for is to face an enemy who does not seek a decision. His focus is on avoiding defeat, which is a strategy of exhaustion. The U.S. may win the battles but lose at the political level because of a loss of will. Said another way, war in the future will still be an extension of politics.⁵⁸

Army forces operating as part of a joint force that can rapidly deploy to prevent, contain, stabilize, or terminate a conflict in its early stages are increasingly important to achieve an effective capability for joint contingency response. Accordingly the newly announced Army vision for strategic dominance across the full spectrum of operations establishes an explicit requirement for the Army of the 21st Century to become more strategically responsive.⁵⁹

Although the Army is capable of full spectrum dominance, its organization and force structure are not optimized for strategic responsiveness. Light forces can deploy quite rapidly but they lack the lethality, mobility, and staying power. Mechanized forces possess substantial lethality and staying power, but they require too much time to deploy, given current joint capabilities for strategic lift, affording the adversary too much time to prepare for the arrival of US forces. As a result, today's joint contingency responses typically follow a sequential deployment pattern that requires considerable time and effort to build up military power sufficient and flexible enough to deter aggression, contain the crisis, and/or shape the battle space and achieve decision. Time is not something the Army will have on future battlefields.

The Army's responsibility to satisfy 21st Century requirements demands an improved capability for the rapid deployment of highly-integrated, combined arms forces possessing overmatching capabilities, exploiting the power of information and human potential, and combining the advantages of both light and mechanized forces, across the full range of military operations.⁶⁰ This is what led to the Army's decision to develop full spectrum medium weight brigades, known as the Interim Brigade Combat Teams (IBCT).⁶¹ In the short term (now until 2015) this is the right response. What about beyond 2015?

To understand the battlefield beyond 2015 it is worth reviewing the fundamentals of maneuver warfare. Maneuver warfare seeks to disrupt and then to destroy the enemy's equilibrium.⁶² That is, to place the enemy off balance and then deliver a decisive blow before he can recover. Though called maneuver warfare, the term includes the combined application of firepower. The purpose of this form of war is to paralyze the enemy's entire command structure so it can no longer function. The first requirement to conduct maneuver warfare is physical, that is the force has to be on the battlefield.

Battlefields in the future will most likely be in places inaccessible by U.S. forces. The requirement for strategic maneuver to place forces in theater will be the critical task. The U.S. requirement for force projection places them strategically on the offensive while the adversary is on the defensive. Once on the ground, U.S. forces must strategically preclude the enemy's deployment by placing itself between the enemy and his operational objectives. By assuming a tactical defensive posture, the Army will accrue all the advantages of a defender. Though this sounds good on paper, it may prove to be more difficult to achieve in practice for several reasons.

Implicit in the success of strategic preclusion is the notion that information superiority will give the Army the capability it needs to exploit its weapon technology. Granted, achieving information superiority may happen. No matter how much information the Army has, it will not be enough to counter the effects of fog, friction, uncertainty, fear, confusion, and ambiguity. Therefore, the Army must be prepared to deal with not having perfect knowledge. As long as the adversary is a living, thinking organism, information alone will not equate to wisdom or knowledge.⁶³

The Army should expect to face competent, capable adversaries equipped with the latest information and weapons technology. As addressed in the discussion of theory, Armies will adapt their doctrine to take advantage of improvements in information and weapons technology as well as develop solutions to counter them. In the short term, the advantage goes to the U.S. Within the next 15-20 years the gap will narrow as proliferation of technology and weapons continues. The impact is that despite all the promises of technological advantage, the Army will still operate in an environment where the defense is still the stronger form of war.

The battlefield will continue to empty with precision weapons in the hands of both sides and as each seeks to avoid the effects of precision fires. As weapons lethality increases the Army should expect the enemy to counter by dispersing further and

operating in smaller units as one means to avoid the effects of superior firepower. This in turn will generate the requirement for the U.S. to operate in smaller formations to counter the dispersion. Smaller units need access to more firepower in order to generate greater combat power at the point of decision.

Armies spread over vast distances and divided into ever smaller tactical increments will no longer be assailable through the use of linear constructs of the direct attack, penetration or envelopment.⁶⁴ Coupled with increased dispersion, there is a reduction in cohesion which increases the difficulty associated with command and control.

To defeat a dispersed enemy the Army must disperse. Close combat will become a contest for control of territory. The battlefield will provide unoccupied spaces that can be assaulted and occupied at minimal cost. Therefore, placing forces between and amongst his widely dispersed formations can collapse the enemy.⁶⁵

One control is to organize combined arms formations at the lowest levels possible. This will give the Army force the capability to generate greater combat power at the point of decision as well as be postured to exploit battlefield opportunities through the exercise of initiative. Even with information superiority, higher headquarters may try to micromanage smaller unit actions but the frequency, tempo, and duration of these distributed smaller actions mitigate against such control at higher levels. Therefore, developing an organizational structure that allows for combined arms at the lowest levels guided by a command and control structure that embraces mission-orders and exploits human initiative will be optimized for future combat.

Rigid air defense grids, interconnected communications nodes and logistic networks of the past will give way to porous, distributed, and autonomous formations able to absorb repeated precision strikes with little loss of people or effectiveness.⁶⁶

The challenge of an enemy so arrayed will be to retain control and cohesion among so many dispersed and isolated elements on the battlefield.

Success in this environment requires the Army to achieve an effective balance between fire and maneuver. Optimizing to use one operational method over the other makes one vulnerable to the effects of the other. The natural response to the threat of an attack by fire is to dig-in, spread out and concentrate on employing firepower from the defense. This makes the defender vulnerable to an assault by maneuver.

The future will in some ways look like the past, at least from a theoretical perspective. Armies will still adapt to increases in lethality by dispersing and addressing the associated C3 problems. The opponent will counter with like adaptation and thus the circle begins anew. The side that best exploits the effects of fire with maneuver as facilitated by the use of information technology at a tempo beyond that which the adversary can handle will usually win. Key to this notion is establishing organizational structures optimized by small, lethal, self-contained all arms formations capable of exploiting battlefield opportunities through initiative and decentralized control. It is this type of formation that the U.S. will need in the future and the one where the transition must begin now. As shown in the next chapter, the U.S. has done almost the opposite of what is needed to fight with fires on the future battlefields.

CHAPTER FOUR

CURRENT SITUATION

Since their inception, the CTCs have collected, analyzed, and published performance related information in the form of positive and negative trends. A common negative trend has been the performance of the fire support system to effectively support maneuver formations. That is, fighting with fires. Negative trends are part of the issue. There are two components--one factual, the other perceptual--that indicate the existence of a problem. What follows below is data collected by the CTCs and comments from some of the Army's senior leaders to describe the indicators of a problem. Next the discussion will address the Army's efforts to fix the problem.

Facts

Writing on the topic of improving the level of Field Artillery (FA) and Fire Support to the maneuver arms, Brigadier General (BG) William F. Engel, Assistant Commandant of the U.S. Army Field Artillery School, Fort Sill, Oklahoma, made the prescient observation that "CTC trends reversal [is] a major issue.... The same negative trends observed 10 years ago at our CTCs still are being observed today at the CTCs."⁶⁷ His comment has never been more right.

Back in 1987 the indirect fire artillery (FA) and mortar mission effectiveness rate was 60% for units training at the U.S. Army's National Training Center (NTC), Fort Irwin, California.⁶⁸ In general terms, this meant the supported maneuver commander could count on indirect fires to successfully achieve the effects he wanted a little more than half the time. Despite the Army's best efforts to identify and fix the problem(s) causing this poor outcome, indirect fire mission effectiveness has continued to drop.

As of February 14, 2001, just a little past midway in the fiscal year, the NTC reports a fire mission effectiveness rate of 12%.⁶⁹ Essentially, in the last fourteen years,

indirect fires have gone from being successful 6 out of 10 times to 1 out of 10. Clearly, the data above indicates a problem.⁷⁰

The U.S. Army's Joint Readiness Training Center (JRTC), Fort Polk, Louisiana, measures fire mission effectiveness differently. The key measure of fire mission effectiveness at the JRTC is the call-for-fire to contact rate. This is a measure of the number of times indirect fires were employed either proactively or reactively in relation to one of the seven forms of contact (indirect fire, direct fire, air attack, obstacles, visual, electronic warfare, or chemical). JRTC reports 20-30% as the standard contact rate.⁷¹ Two units were well outside the norm achieving in the first case a 60% contact rate and in the second 87% contact rate.⁷² Their approach may be significant to how to train for the future.

Pragmatically speaking, the failure of the fire support system to show tangible benefit creates at least two conditions, both bad. The first is the supported maneuver commander will become more reliant on his direct fire systems to achieve the effects he wants. Second, and more dangerous, the fire support community is creating the perception among several generations of maneuver officers that it is not worth the time and effort to integrate and synchronize the effects of fires with maneuver.

Despite the best efforts of numerous senior leaders, observer/controllers (O/Cs), doctrine writers, small group instructors, maneuver and artillery commanders and command sergeants major, when one part of the combat power equation is broken, the whole organization is impacted. The comments below, though more rooted in perception, also point to a problem.

Improving the Demand Side of Fire Support

Brigadier General (BG) Huba Wass de Czege wrote on the topic improving fire support responsiveness back in 1993. In his article, "Improving the Demand Side of Fire

Support," BG Wass de Czege noted that there is both a "supply" side and a "demand" side to fire support.⁷³ The demand side of the equation, realm of the maneuver commander, is where the problem of when and where to bring fires to bear is addressed. The supply side, realm of the fire supporter, is where the problem of getting rounds downrange to satisfy demand is solved. He suggested that the inability to fight with fires was not caused by either the fire marking or fires replication systems used at the CTCs and that the required fix does not involve changing doctrine.⁷⁴ Instead, he posited, "the real challenges are the timeliness and location of fires with respect to an uncooperative enemy within a combined arms plan."⁷⁵

In sum, he concluded "that what is needed is a better understanding of the tactics and techniques of combined arms and how indirect fires are integrated—a clearer understanding of the combined arms dynamic."⁷⁶ The dynamics referred to here are the interrelationship between fire and maneuver and their effect on the development of combat power. As the monograph discussed earlier (review of theory), this interrelationship and the manner in how it is controlled is one of the most crucial elements to improving responsiveness and effectiveness. Clearly, BG Wass de Czege was very perceptive. However, he was not alone in his perceptions. Though he wrote eight years ago, parts of his argument are still valid as shown by what follows.

Classical Fire Support vs. Parallel Fires

Lieutenant Colonel Robert "Bob" Leonhard's article, "Classical Fire Support vs. Parallel Fires," criticizes the artillery for changing its role. He accuses the artillery of changing its focus from providing close support (base of fire) to a separate system that exists unto itself.⁷⁷ The net result being a loss in responsiveness and effectiveness as measured in the eyes of the maneuver community. He wrote that the Army's fire support

doctrine had changed for three reasons: the advent of AirLand Battle, technological advances, and the culture of the artillery branch.⁷⁸

AirLand battle generated the requirement to attack the enemy in depth (deep-fight) as the means to establish favorable force ratios in the close fight. As the artillery optimized and became more efficient at executing the deep fight they moved away from the close fight.⁷⁹

Digital fire control nets further complicate the problem. The digital nets remove the maneuver commander away from the fire support system while they (the fire supporters) enjoy a system that has increased the efficiency of massing fires while simultaneously making synchronization impossible.⁸⁰

Lastly, Leonhard believes the artillery culture is reluctant to go back to a system where they are the in the customer support role as opposed to being in the driver's seat.⁸¹

Leonhard's comments are on the mark. While there is room to debate specifics in his findings, on the whole he has made a solid case to explain why the fire support community is ineffective—at least in the minds of the maneuver world.

Proactive Artillery for Fast, Responsive Fires

Lieutenant General (LTG) James T. Hill, Commander I Corps, also criticizes the fire support community for being unresponsive. LTG Hill says "to make fires more responsive, the Field Artillery needs to focus on changing the mindset of Field Artillerymen."⁸² Talking from a light infantry perspective, LTG Hill makes the point that the fire supporter should get indirect fires into the fight every time as a means to extend the effectiveness of the base of fire beyond direct fire weapons range.⁸³ LTG Hill considers the measure of success the number of times the artilleryman used fires in the close fight and the number of rounds fired.⁸⁴

While LTG Hill mistakenly believes the digital fire control systems are not part of the problem, his other comments are on target. He addresses culture primarily. The culture in this case is one that is focused on massing fires and using digital systems to make that system more inefficient. The cost being the loss of responsiveness. Maybe the comment, "...a few rounds right now is better than a whole bunch a lot later" is appropriate. This would require a certain amount of decentralization over the control of fires and would in all likelihood get the artillery back into the close fight.

Is the FA Walking Away From The Close Fight?

Major General Carl F. Ernst, while serving as Chief of Infantry, wrote an article entitled "Is the FA Walking Away From The Close Fight" to describe what he believes is a failure on the part of the fire support community to effectively support the close fight.⁸⁵ To him, the echelonment of fires and the fires preparation are two examples of where the breakdown between fire and maneuver has occurred.⁸⁶

To anyone who has ever seen a World War I movie showing large amounts of artillery impacting on a target and, just as the firing stops, a sergeant blows a whistle and the soldiers climb over the trenches and advance across open ground, that person has an idea what the fires preparation and echelonment of fires is all about (they are different forms of the same thing).⁸⁷

Their purpose is to provide continuous suppressive fires on the target to allow the supported maneuver force to close as closely as possible before they take over the fight using direct fire weapons. Success in this sense is the further out the target can be engaged and the longer it can be suppressed, the better it is for the supported maneuver unit. Clearly, MG Ernst is a believer in the value of indirect fires being part of the fire and maneuver equation. However, the organizational structure and safety constraints mitigate against practicing this in peacetime.

The Role of the FA and Fire Support In Transformation

General John N. Abrams, Commanding General of Training and Doctrine Command. Unlike the others mentioned above, General Abrams was not critical of the fire support community. His concerns are posturing the force for the future. He believes that "we are looking for increases in teams of soldiers at the lowest possible levels enabled by technology."⁸⁸ He further states that the IBC will operate in 50 x50 square kilometer area which generates time and space challenges.⁸⁹ Part of the solution is maneuver warfare where there is a "...seamless integration of real-time fires as part of manneuver—a synergy of combined arms. This is the core of the Objective Force capabilities...."⁹⁰ Clearly, General Abrams comments show he embraces the theory of the empty battlefield along with fire and maneuver. His use of technology in the hands of soldiers at the lowest levels is in line with what is needed for the future.

The arguments cited above reflect some of the sentiment shared by the Army at large. Generally, the collective perception is the fire support community has optimized itself out of business. A quick look at some of the actions the Field Artillery School has taken to fix the problem will show that in fact, the maneuver critics are right.

Fort Sill Fixes

In January of 2000, to solve the problem, Major General (MG) Toney Stricklin, Chief of Field Artillery (FA), convened the first Tactical/Operational Fire Support Conference at the Field Artillery School, Fort Sill, Oklahoma.⁹¹ For three days an assembled grouping of maneuver commanders and their command sergeants majors (CSM) from the army, corps, division, and brigade levels, along with senior FA commanders and their CSMs, fire support observer/controllers (O/Cs) from the CTCs,

and a host of others, collectively sought to solve FA and fire support problems for the maneuver commander.

The attendees were chartered to recommend solutions for a series of fire support issues that indicated the FA has lost its focus on supporting the maneuver commander, particularly in the close fight. The original list of issues primarily came from three sources. One source were the issues raised by Chief of Infantry, MG Carl F. Ernst, in his article "Is the FA Walking Away from the Close Fight?"⁹² Another source were the issues gathered by the MG Stricklin in his travels and discussions with both branch and maneuver leaders.⁹³ The third source were the ongoing CTC negative trends collated by the Center for Army Lessons Learned.⁹⁴

The conference attendees scrubbed the list and placed the issues in four categories.⁹⁵ First, those issues requiring long-term solutions and resolutions above FA branch level. Second, issues listed for the FA to solve immediately without outside input. Third, those the FA must work over the long term. Problems not falling into any of the above categories were placed in a fourth. Conference attendees brainstormed items in the fourth category to develop solutions that if implemented would result in significant improvements for fire support for the maneuver commander. In the whole, the collective solutions continued to optimize the fire support community for centralized control.

The linear problem solving methodology outlined above invariable leads to solutions which fixes indicators and not the root problem. Collectively, the conference attendees agreed to make six immediate improvements as the means to improve the responsiveness of fires.⁹⁶

On the surface the problem solving approach described above makes a great deal of sense. It has the value of achieving "buy-in." That is, everyone with a vested interest in the outcome had an opportunity to voice his concerns and challenge those of others before coming to closure with the implicit contract that once consensus is

reached, everyone will support the idea. Next, the problem solving approach has value in the quality of the solutions reached through harnessing the collective wisdom and experiences of some of the Army's brightest and most experienced leaders. Additionally, this approach has the value of achieving a certain amount of integration and synchronization in the development of near, short, and long-term solutions based on the combination of battlefield operating systems being represented by the conference attendees.

Clearly, an approach as those above merit little room for criticism. Indeed, it would be foolish to state that the proposed solutions will not solve the problem. It is better to say that a look at the problem from a different perspective may shed more light on the root cause of the problem rather than treat the symptoms.

Digital Technology—Optimized Inefficiency

The single item that would provide the highest payoff towards improving the effectiveness of fires is the development of technology that allows the fire support community to operate the current automated Tactical Fire Control TACFIRE System (TACFIRE) and the future Advanced Field Artillery Tactical Data System (AFATDS) as part of a fire support system emphasizing **decentralized** operations. This section discusses this proposition by doing four things.

Under the "pre-digital communications system" providing responsive fire support was very simple. A forward observer (FO) submitted his call-for-fire (CFF) over a **voice** radio net directly to an habitually associated firing battery. The firing battery then manually computed tactical and technical firing solutions to support the observer. The FO's company and battalion fire support officers (Co and Bn FSO respectively) monitored his submission of the CFF and intervened if the fire mission violated fire support coordination measures (FSCM). Silence on the radio by the fire support officers

constituted consent to fire the mission. The battalion fire direction officer (Bn FDO) also monitored submission of the CFF. The Bn FDO determined if the nature of the target required him to mass the battalion's fires. Silence on his part constituted consent for the habitually associated firing battery to fire the mission. In short, the FO submitted his CFF **directly** to a firing battery. The firing battery would fire the mission unless either the Co FSO, Bn FSO, or Bn FDO intervened. Under this system the Field Artillery provided responsive fire support within a **decentralized** environment.

This changed with the advent of TACFIRE and has not changed since the fielding of the AFATDS. The task of providing responsive fire support under these automated system is more complex. Under this system the FO submits his CFF over a **digital** radio net to the battalion fire direction center (Bn FDC) not directly to a habitually associated firing battery. The Bn FDC uses the TACFIRE/AFATDS computer to derive a tactical firing solution and to determine if the fire mission violates any of the FSCMs. If a fire mission violates a FSCM the Bn FDO **contacts** the Co or Bn FSO to obtain clearance before firing the mission. Under the manual system either the Co or Bn FSO contacted the FDC if the fires required clearance. If the mission does not violate a FSCM the Bn FDO sends **digital** messages to direct any one or all of the firing batteries to fire the mission. The Bn FDO also sends a digital message to the Co and Bn FSO to tell them a mission is in progress (in the automated system the FSOs cannot monitor the FO's initial CFF when it is sent using a DMD). Upon receipt of the fire order the selected firing battery(ies) computes the technical firing solution and attempts to establish radio contact with the FO. Once the firing battery and the FO establish radio contact the mission is then fired. In brief, the FO submits his CFF to the Bn FDC. The Bn FDC computes tactical fire control data and coordinates the clearance of fires. The Bn FDC passes tactical fire control data to the selected battery(ies) who then compute technical firing solutions. The Bn FDC then tells the Co and Bn FSO that a mission is in progress.

The firing battery fires the mission once they have communications with the FO. Technical limitations of the automated systems require the Field Artillery to conduct **centralized** operations. Centralized control of the fire control system significantly reduces the Field Artillery's ability to provide responsive fire support and is the root cause of the majority of problems facing the Artillery today..

The result of comparing the manual to the automated system is the identification of at least three factors that contribute to the Field Artillery's inability to provide responsive fire support: elimination of the direct communications link between the FO and a habitually associated firing battery; mandating that the Bn FDC and not the battery FDC perform tactical fire control; and placing the Co and Bn FSO into a situation where they reactively coordinate the clearance of fires. The cause of these problems is directly attributable to a limitation inherent in the TACFIRE/AFATDS digital communications system. A change in technology that would allow these actions to occur simultaneously would add greatly to solving the problem. Changing from centralized to decentralized control gets directly at the root problem and also postures the fire support community to fight in the future. As part of that process, there are some other things that need to happen.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

Arguably, there is room to debate the accuracies of the numbers, to argue about data-points, and to critique either collection or analysis methodologies. Any discussion that would refine the information would give more credence to the information presented. However, the essence of the argument would remain unchanged. That argument being that there is ample evidence to indicate that the brigade combat team has problems fighting with fires. In a discussion of a complex problem like this one it is not enough just to look at the output of the systems. It is just as important to identify then fix the root proximate cause of the problem

In all fairness, the fire support community's most vocal critics, LTG Hill, MG Ernst, BG Wass de Czege, and LTC Leonhard, raise some valid points. Rather than dispute their comments or nit-pick at specific points from a defensive, reactive posture, the approach here is to accept their comments at face value as being valid and use them alongside factual evidence as the start point to develop a solution.

The proposals presented here are in no means meant to say that individually or collectively fire supporters do not know how to fix the problem. Indeed, one of the factors contributing to the problem is in the "how" fire supporters have tried to fix the problem—a managerial approach designed to get to the bottom line and solve the problem. To date, their approaches to solving the problem have made great sense.

Video-teleconferences and visits to the field by leaders and instructors from the "School House," have helped to narrow the gap between what is happening on the ground to what is happening in the school. Fort Sill's sponsorship of the various fire support and tactical/operational fire support conferences have harnessed the collective wisdom and experiences of some of the Army's senior leaders. The fire support community's approach to building tactics, techniques, procedures (TTPs) has filled the

void between doctrine and reality and will benefit generations of fire supporters to come. The infusion of talent from the field to the CTCs, from the CTCs back to either the field or school houses of the institutional Army provides a uniquely effective leavening effect. Successful integration into combined arms formations and continuous advancements in acquiring and attacking targets faster, at longer ranges, and with a effectiveness surpassing anything in the history of warfare retains the artillery's position as the maneuver commander's weapon of choice for providing a base of fire to facilitate maneuver.

In sum, the effect from the collective problem-solving approaches has made the fire support community more precise and efficient in applying fire support doctrine. However, precision and efficiency do not always equate to effectiveness. Especially when they have not identified the true problem.

Effectiveness in this sense is not the number of rounds fired. A number of fire supporters have wrestled with this requirement and do it because they had to. A better measure would be to ask of the number of rounds fired, how many are achieving the desired effect.

Effectiveness in this sense is not the number of fire missions conducted and the resultant effectiveness rate. Though closer to answering the question are is the fire support system achieving the desired effect (the maneuver commander's desire expressed in the essential fire-support task), its chief benefit lies in establishing a framework for isolating components for analysis to identify breakdowns in the fire support system.

To be far, this particular measure is a "CTCism" that has a few Problems. First, this metric is bounded by CTC rules of engagement (ROE) and the well-known problems in fires replication. Changing the ROE to something that better replicates the actual effects of fires would improve fire mission effectiveness. Clearly,

there is not advocacy for making the rules easier so that the fire support community "looks" better. Rather, Training and Doctrine Command should make use of the Field Artillery School's empirical data to make the ROE better approximate reality.

The second part of the ROE dilemma is getting the maneuver community to buy-in to a change in philosophy that allows fires to achieve realistic effects knowing full-well the cost may well be a reduction in training opportunities for maneuver units in the direct-fire fight. They, the maneuver community, cannot have it both ways.

The key is to achieve balance for the Army to take the long-term view. The Army as a whole will benefit from educating today's generation of combined arms leaders to the effectively set conditions for the close fight (the essence of fighting with fires) through the use of indirect fires. Modifying the ROE along with the forthcoming improvements in fires replication would in effect achieve more realism. If the Army takes a short-term view, meaning the ROE remain skewed towards limiting the effects of fires, the reality is the Army will never get there from here.

Though expedients for the peacetime Army, making changes in the CTC philosophy is only a partial solution. Quite frankly, this part of the overall solution specifically addresses shaping perceptions in a peacetime environment as a precursor for achieving success on "tomorrow's" battlefield. What the Army still needs is to improve effectiveness as measured in the eyes of the maneuver commander.

One measure of success that gets at the perception of effectiveness is the call-for-fire to contact rate as associated with fire mission effectiveness. This measures the number of times indirect fires were used reactively as part of actions on contact. The chief benefit of this metric is that it answers the questions as to whether or not the entire fire and maneuver system is both synchronized and responsive.

The fire support doctrinal underpinnings captured in the 1988 version of Field Manual 6-20, Fire Support in the AirLand Battle, are rock solid. The review of theory

showed the purpose of artillery fires has always been the means to provide a base of fire for maneuver. Whether the artillery was employed to fire directly against front-line troops, against the enemy's artillery, or to fire at targets in depth beyond direct fire range, the purpose has always been to create conditions for some form of decisive maneuver.

Success in this context was the maximum number of rounds delivered at the point of decision in the shortest time possible. Makes perfect sense. It takes less time to deliver 1000 rounds if you have 1000 tubes each firing 1 round instead of 1 tube firing 1000 rounds. Possibly, the greatest aid to centralizing control of fires in compressed time, and the second "true" revolution in military affairs, was the advent of digital communications that gave the Artillery the ability to transfer large amounts of information quickly and efficiently.

It would be hard to argue against the efficiencies associated with the use of digital communications. However, the fact that digital communications were developed and employed without a doctrine to direct their actions led to a number of problems which outweighed the benefits. The development and employment of digital communications to support Army warfighting doctrine provided unrivaled capability to centralize control over fires which in theory makes it easier to mass. In practice the story is slightly different.

Assuming that both the data and perceptions are accepted as an accurate snapshot of how the Army's fire support system is performing at the brigade level and below, at least three immediate questions arise. First, what is causing this condition or why is it happening? Second, what are some of the unintended effects of this condition that must be addressed as part of solving the problem? Lastly, what must be done to fix the problem(s)?

Adoption of this solution requires fundamental changes within the Field Artillery as related to the TRADOC domains or DTOMLS. There is no need to change the Field Artillery's fire support doctrine. The doctrine is flexible enough to support either decentralized or centralized operations. However, a return to the **decentralized** approach would require major revision of the tactics, techniques, and procedures manuals. The Field Artillery's institutional and field training programs would require major revision, especially the fire direction and fire support systems. Fire direction training would have to place more emphasis on the nuances of tactical fire control. The fire support system would have to increase training on equipment operations skills. In the short term, the existing fire support organizational structure would not require change. In the long term, assignment of a firing battery to each maneuver battalion and further assignment of heavy mortars down to company level in medium and heavy units would add to the combined arms capability and the lowest levels. Leader training would require each military occupational skill producing course to change its curriculum. That is the Field Artillery would have to push higher skill level tasks down to lower levels (e.g., training on subscriber table management would have to move down from the staff sergeant to the sergeant level).

Changing to an approach emphasizing maximum feasible decentralized control and making the needed changes within the framework of TRADOC's DTOMLS would represent a fundamental change to the Field Artillery. These changes in the fundamental approach in the way fire supporters conduct their craft would be a paradigm shift. Structuring, training, and educating for decentralized operations solves the Army's problem now and postures them for the future.

ENDNOTES

¹ U.S. Army, Field Manual 6-20: Fire Support in the AirLand Battle, (Washington D.C.: Department of the Army, 1988), p. v.

² In late 1991, while assigned as Assistant Commandant, U.S. Army Field Artillery School Fort Sill, Oklahoma, Brigadier General (now General) Tommy R. Franks used to show "before" and "after" slides to illustrate his view on the essence of fighting with fires.² Both slides were similar in construct and were built as follows. Each slide depicted a typical military rifle range complete with separate lanes for each rifleman. Each lane was labeled with the name of the Army's battlefield operating systems. Each slide also contained a range tower, labeled "maneuver commander." The "before" slide showed the maneuver commander passively observing each of the battlefield operating systems engaging targets in their respective lanes. The "after" slide showed the maneuver commander actively directing the collective body of battlefield operating systems as they all engaged the same target.

Besides showing the advantages of synchronization and massed effects, the slides illustrated that battlefield operating system performance is ultimately and directly linked to the quality of guidance and level of the maneuver commander's involvement and to the degree in which each operating system is able to cooperate with the other in supporting the commander. The lessons of relevance for the discussion here are two-fold. First, it is the maneuver commander's responsibility for all that his operating systems do or fails to do. Second, a central element to fighting with fires is the degree to which each of the respective operating systems is able to cooperate within the framework of doctrine, training, organization, materiel, leader development and soldiers (DTLOMS).² Neither of these lessons is meant to be critical or to pinpoint blame or even affix responsibility. The purpose is to illustrate the point that in combined arms operations it is collective performance that is key. Therefore, any solutions that attempt to fix any one part of the system must take into consideration the other parts of the system.

While assigned as General Franks' Executive Officer from 1991-1992, I had opportunity observe the development and production of the slides. The U.S. Army Field Artillery School Initiatives Group, headed by Colonel John P. Drinkwater and staffed by Lieutenant Colonel Sammy P. Coffman and Captain Todd Travas, built this series of slides in response to direct guidance from General Franks to fulfill his requirement to prepare the Field Artillery School's response to the U.S. Army Combined Arms Command on the subject of commander's intent and commander's guidance. It was during this series of exchanges that General Franks coined the phrase "fighting with fires" which then Commandant, Major General Fred F. Marty, saw fit to adopt as a theme that is still much in use to this day.

³ U.S. Army, Student Text 3-0, Operations, (Fort Leavenworth, KS: United States Army Command and General Staff College, 2000), p. 1-17.

⁴ Ibid, p. 1-17.

⁵ U.S. Army, Field Manual 25-101: Battle Focused Training, (Washington D.C.: Department of the Army, 1990), p. 1-4.

⁶ Ibid, p. 1-4.

⁷ Ibid, p. C-2.

⁸ Ibid, p. C-2, figure C-1.

⁹ U.S. General Accounting Office, "Military Readiness: Full Training Benefits From Army's Combat Training Centers Are Not Being Realized" (Washington DC: Government Printing Office, 1999), p. 3.

¹⁰ Center for Army Lessons Learned Database at [Http://call.army.mil](http://call.army.mil)

¹¹ Stephen R. Covey, quoting Peter Drucker and Warren Bennis in The 7 Habits of Highly Effective People (New York: Simon & Schuster, 1989), p. 101.

¹² Virgil Hurley, Speakers Sourcebook of New Illustrations (Dallas: Word Publishing, 1995), p. 249.

¹³ U.S. Army, Student Text 3-0, Operations, (Fort Leavenworth, KS: United States Army Command and General Staff College, 2000), p. 5-1.

¹⁴ For the purposes of this discussion, the combined arms commander is either an infantry or armor brigade commander.

¹⁵ Robert R. Leonhard, *Fighting By Minutes: Time and The Art of War*, (Connecticut: Praeger Publishers, 1994), p. xix.

¹⁶ *Ibid*, p. xix.

¹⁷ *Ibid*, p. xxi.

¹⁸ *Ibid*, p. xxi.

¹⁹ Carl von Clausewitz, *On War*, (New Jersey: Princeton University Press, 1976), pp. 186, 231. Clausewitz was the son of a retired Prussian Army officer. He entered the Prussian Army as a cadet at the age of 12 in 1780. One year later Clausewitz fought in the War of the First Coalition against France, 1793-1794. It was during this war that he received his officer's commission. In 1803, Clausewitz graduated from the top of his class at the Military School of Berlin. He then became the Aide to Prince August of Prussia. Clausewitz fought again in 1806 in the Jena Campaign where he was captured by the French. After the war, Clausewitz assisted in the reorganization of the Prussian Army. He also taught at the Prussian Military School and was assigned as the Military Instructor of Frederick William IV, Crown Prince of Prussia. In 1812 Prussia aligned with France against the Russians. Clausewitz saw this as traitorous and as a result resigned his commission to join the Russian Army. He served with the rear guard covering the Russian retreat and later in the pursuit of Napoleon. He served as a liaison officer during the campaign of 1813 and Corps Chief of Staff during 1814. Clausewitz reentered the Prussian Army in 1815. In the Waterloo Campaign of 1815, Clausewitz served as Corps Chief of Staff. Clausewitz did most of his writing from 1815-1830 while a Major General and Director of Administration at the Prussian War School. He stopped writing in 1830 upon his transfer to the artillery and assignment as Army Chief of Staff. He died in 1831 at the age of 51.

His major writings consisted of seven books published by his widow after his death. These books are: *ON War*, *The Italian Campaign (1796-1797)*, *The Campaigns of Switzerland and Italy, 1799*, *The Wars of 1812, 1813, and 1814*, *The Waterloo Campaign*, and two volumes describing several campaigns conducted by leading generals and strategists. His most important work has been *On War*. In it, Clausewitz developed his theory of war. *On War* concerns strategy at the strategic and operational levels.

²⁰ William J. Wansley, "American Spirit: A Leadership Philosophy for U.S. Tactical Forces, (Fort Leavenworth, KS, 1991), p. 6; James J. Schneider, "The Theory of the Empty Battlefield," *Journal of the Royal United Services Institute (RUSI) for Defence Studies*, (September, 1987), pp. 6-9.

²¹ Schneider, "Theory of the Empty Battlefield," (*Journal of the Royal United Services Institute (RUSI) for Defence Studies*, September, 1987), p. 6

²² *Ibid*, p. 9.

²³ *Ibid*, p. 37

²⁴ Ivan S. Jean de Bloch, *The Future of War*, (Boston: The World Peace Foundation, 1914), p. xxvii; Christopher Bellamy, *The Future of Land Warfare* (New York: St. Martin's Press, 1987), pp. 274-275.

²⁵ Ardant Du Picq, *Battle Studies*, (Harrisburg, 1987), p. 72. Colonel Ardant Du Picq was a career French Army officer and military theorist who was well qualified to write about the human dimension in war in *Battle Studies*. He was born in 1831 and commissioned a sub-lieutenant after graduating from Saint-Cyr in 1844. He died as a colonel in 1870 from wounds received while leading his regiment in the Battle of Borny during the Franco-Prussian War (1870-1871). His other major combat experiences were the Crimean War (1853-1856) where he was captured and held for three months and the Syrian Campaign (1860-1861).

Du Picq's purpose for writing *Battle Studies* was to instruct the French officer corps on the key element in war. He states "Nothing can be wisely prescribed in an army . . . without exact knowledge of the fundamental instrument, man, and his state of mind, his morale, at the instant of combat (p. 65). Du Picq believed that through instruction based on historical analysis of human performance in battle he could educate, mature, and inspire the next generation of French Officers.

Du Picq used historical examples and personal experiences (his and others) to discuss a variety of major ideas on the human dimension in war, especially on the topic of cohesion. For example, he used the Battle of Cannae to show that cohesion, when present on one side and lacking on the other allows a small force to defeat a much larger one (Hannibal attacked with a

force of 36,000 and defeated the Roman force of 70,000). Du Picq started his argument by explaining how man will take extraordinary steps to avoid getting killed and that the instinct for self-preservation is so strong that without some way to overcome this instinct there could be no unity of effort. Du Picq then offered a solution for overcoming fear. He stated "Discipline has for its aim the domination of that instinct by a great terror" (p. 77). Du Picq believed discipline could help man overcome the fear of death. He also stated that discipline has limitations and that something else is needed to induce men to fight in the face of death. Du Picq then offered the solution of cohesion. He believed that when all else fails men will fight for each other. This is why the wise leader should take steps to create an environment where soldiers bond with their comrades. He showed how Hannibal employed forms of cross training and maintenance of unit integrity to keep his multi-ethnic force unified. Du Picq concluded by showing the chain of events surrounding the collapse of cohesion. He demonstrated how Hannibal's strategy of isolating the Roman forces reduced their unit cohesion and then caused a breakdown in discipline which enabled Hannibal to defeat the much larger force.

²⁶Ibid, p. 72.

²⁷Ibid, pp. 71-72.

²⁸Ibid, p. 73.

²⁹Martin Van Creveld, Command in War, (Massachusetts, 1985), p.1. Martin Van Creveld is an internationally renowned military historian. He has no military background, but has been an observer of modern warfare, to include several of the Middle East wars, the Vietnam War, and the war in Afghanistan. He received a PhD from the London School of Economics. He is also a Fellow of War Studies at Kings College, Cambridge. He has also taught and lectured at the United States Marine Corps Command and Staff College in the period 1991-1992.

He is a prolific writer who applied Hans Delbruck methods of Sachkritik to modern warfare to assess the relevance of traditional ways of thinking about warfare. His study of the factors leading to success in battle throughout history formed the basis for Fighting Power: German Military Performance, 1914-1945, and Fighting Power: German and U.S. Army Performance, 1939-1945, a striking comparison of the masters of the profession with the amateurs who did them in. He wrote Military Lessons of the Yom Kippur War: Historical Perspectives in 1975. In this work he discusses the tremendous lethality on the modern battlefield. He suggests that the defense is the dominant form of battle. The implications of this realization are a return to longer and more total wars. He also concludes that modern warfare reinforces the importance of the relationship between society and the military. As with the U.S. experience in Vietnam, the Middle East experience showed that a nation cannot win a war with just its military arm--it must have the support of the totality of society. Supplying War: Logistics from Wallenstein to Patton, written in 1977, is an in-depth look at the importance of logistics to warfare--in fact it is the most critical leg of warfare according to Van Creveld. Command in War, written in 1985, outlines the development of command since ancient Greeks. Van Creveld discusses the importance of commanding, staff organization, communications, weaponry, and logistics, in not only theory, but also practice, through an in-depth study of many battles. One of his important conclusions is that while technology brought on many new possibilities, it has brought new limitations as well.

³⁰Ibid, p. 9.

³¹Ibid, p. 9.

³²S. L. A. Marshall, Men Under Fire, (New York: William Morrow & Co.), p. 23.

³³Blake, Lord and C. S. Nichols, Eds, Dictionary of National Biography, 1971-1980, (New York: Oxford University Press, 1986), pp. 913-914. Lord Moran was born Charles McMoran Wilson at Skipton in Craven, Yorkshire, on 10 November 1882. Educated in London, Lord Moran entered St. Mary's Medical School in 1902 and graduated as a medical doctor with honors in 1913. His first position was as the medical registrar of St. Mary's Hospital.

When England entered the World War I, Lord Moran enlisted in the Royal Army Medical Corps and was assigned to the 1st Battalion of the Royal Fusiliers. He spent two years on the front lines and was drastically affected by the horrors and heroism of trench warfare. He was awarded the Military Cross in 1916 for bravery during the battle of the Somme, as well as the Italian silver medal. Moran ended his service in the war with the rank of major.

During his years on the front line Moran kept a diary chronicling the stresses affecting soldiers. This diary inspired him to write the Anatomy of Courage in 1945. This work described how courage could either become strengthened or spent in combat. For many years Moran lectured at the British Army Staff College at Camberley on how courage and fear affected soldiers.

³⁴ Lord Moran, The Anatomy of Courage, (New York: Avery, 1945) pp. xvi, 17, 64.

³⁵ Ibid, pp. 62, 64, 69, 81, 102, 146.

³⁶ Ibid, pp. 156, 162, 174, 180.

³⁷ Roger J. Spiller, Ed., Dictionary of American Military Biography, (Connecticut: Greenwood Press, 1984), pp. 737-741. Samuel Lyman Atwood Marshall born in Catskill, New York, on 18 July 1900, was a military writer, journalist and Army officer who pioneered combat history techniques in during World War II.

Marshall enlisted in the Army in 1917 and saw combat in World War I while assigned to the 90th Division fighting at Soissons, St. Mihiel, the Meuse-Argonne, and Ypres-Lys. In 1919, while still in France, he was commissioned as an infantry lieutenant. In the period between 1922 and 1940 Marshall worked as a journalist for various news organizations. During this period Marshall opened a correspondence with J.F.C. Fuller. Fuller strongly influenced Marshall's views on the future of mechanized war. Marshall captured the ideas in his first book Blitzkrieg. Publication of this book brought Marshall to the attention of Henry L. Stimson, the Secretary of War.

Marshall initially worked for Stimson as major assigned to the Office of War Information. Later, Marshall joined the historical service. Now a Lieutenant Colonel, Marshall observed and reported on several battles. During one of these he noted that no two soldiers could offer the same view of the battle. Intrigued, Marshall began to investigate in detail the dynamics of tactical operations, a subject that became his life's work.

In 1946 Marshall wrote Men Against Fire to provide an account of all that he had learned in war. His experiences taught him that the soldier is ill prepared for what awaits him on the battlefield, despite the training he may have had. He concluded that the gap between the soldier's training and the soldier's battle meant that fewer than 25% of all infantrymen ever fired their weapons in combat. The crux of the solution is in the degree to which soldiers could band together, forming groups for mutual survival. Marshall noted that where soldiers were close to one another, for example in a tank crew, artillery piece, or machinegun, their performance was not a problem. From this observation Marshall deduced that the proximity of comrades allowed the soldier to withstand the horrors of war.

Marshall continued to write on military subjects. His writings cover the Korean War, the Arab-Israeli War, and the Vietnam War. He died in El Paso in 1977.

³⁸ Marshall, Men Under Fire, pp. 42, 123-124, 149, 161, 170. S.L.A. Marshall believes that "... one of the simplest truths of war that the thing which enables an infantry soldier to keep going with his weapons is the near presence or presumed near presence of a comrade." Therefore, the formation of a group tends to improve the individual's chance for survival. Once formed, the primary group exists as long as needed to support the needs of the members.

³⁹ Anthony Kellet, Combat Motivation, (Boston: Kluwer-Nijhoff, 1982), pp. 19-58, 79-117, 133-163, 217-269. Anthony Kellet is a Canadian who has served for a period of time with the Royal Canadian Hussars. The book, Combat Motivation, is based largely on a study prepared for the Canadian Department of National Defence and published in 1980. The purpose of the study was to review the subject of combat motivation for the purpose of improving the leadership, administration, and training of the Canadian armed forces. The result is a mixture of behavioral science and military history. The examples are taken largely from the Twentieth century's wars and from British, Canadian, and American actions in particular.

At one time or another during their careers, most military commanders speculate about what motivates their men to fight. George Washington, for example, wrote to the Congress that, "Three things prompt men to a regular discharge of their duty in time of action: natural bravery, hope of reward, and fear of punishment." Other military writers such as Ardant Du Picq and S.L.A. Marshall have maintained that soldiers are motivated primarily by feelings of comradeship.

Speculations as to what motivates men to fight and a variety of other aspects of motivation are covered in Combat Motivation. Since much of the book goes well beyond what a behavioral scientist would call motivation, the book's subtitle, The Behavior of Men in Battle, is actually a more accurate description of the contents than the title itself. There are, for example, sections on training, military discipline, organizational policies such as troop rotation and descriptions of combat in addition to discussions of such standard motivators as patriotism, religious beliefs, punishments, and rewards.

⁴⁰Ibid, pp. 97, 100, 102, 103, 104. Kellet's argument mirrors that of S.L.A. Marshall. Kellet states that the moral support provided by the group has been a feature of both close-order and open-order warfare and, quoting S.L.A. Marshall, that "one of the simplest truths of war that the thing which enables an infantry soldier to keep going with his weapons is the near presence or presumed near presence of a comrade. The point Kellet makes is that groups are made up of individuals. The reason why individuals form groups is for comradeship, group solidarity, mutual risk, and leadership. Therefore, individuals join for their own survival and once the group is formed, the purpose of the group is to ensure the survival of the members.

⁴¹Samuel B. Griffith, Sun Tzu: The Art of War, (New York: Oxford University Press, 1943), p.42.

⁴²Comment heard by the author during a Battle Command Training Program exercise in May of 1993.

⁴³U.S. Army, Field Manual 7-8: Infantry Rifle Platoon and Squad, (Washington D.C.: Department of the Army, 1992), p. 1-2 and the LTC Don Holder's, III Corps Maneuver Booklet, (Fort Hood, TX: 1987), pp. 15-18.

⁴⁴Ibid, FM 7-8, p.1-2.

⁴⁵Ibid, p.1-2.

⁴⁶Ibid, Holder, p. 15.

⁴⁷Ibid, p. 16.

⁴⁸Ibid, p. 17.

⁴⁹Ibid, p. 18.

⁵⁰Ibid, p.18.

⁵¹Dennis Steele, "The Hooah Guide to Army Transformation", Army Magazine, Volume 51, February 2001, No. 2, page 23

⁵²Ibid, p. 20

⁵³There are two Joint Vision documents. Joint Vision 2010 published in 1996 was the first and laid the general foundation. Joint Vision Document 2020 published in 2000 extended the work already set forth in the previous document.

⁵³Ibid, p.1.

⁵³Chairman of the Joint Chiefs of Staff (CJCS), "Joint Vision 2010", (Washington D.C.: Government Printing Office, July, 1996, p. 2.

⁵⁴CJCS, "Joint Vision 2020", (Washington D.C.: Government Printing Office, 2000, p. 1.

⁵⁵CJCS, "Joint Vision 2010", p. 2.

⁵⁶Ibid, p.1.

⁵⁷Ibid, p.1.

⁵⁸Carl von Clausewitz, On War (Princeton, 1976), p. 89

⁵⁹U.S. Army, "Interim Brigade Combat Team, Operational and Organizational Concept" (Virginia: Training and Doctrine Command, April 2000), p. 4.

⁶⁰Ibid, p.5.

⁶¹Ibid, p.5.

⁶²⁶²Robert H. Scales, Future Warfare Anthology. (Pennsylvania: United States Army War College, 1999), p. 68.

⁶³Ibid, p.63.

⁶⁴Ibid, p. 70.

⁶⁵Ibid, p.71.

⁶⁶Ibid, p. 70

⁶⁷Brigadier General William F. Engel, "Report to the Field: Tactical/Operational Fire Support Conference." Field Artillery Journal, Vol. V, No. 3, May-June 2000, p.35 Carl F. Ernst, "Is the FA

Walking Away From The Close Fight." Field Artillery Journal, Vol. IV, No. 5 September-October 1999,

⁶⁸ Michael J. Bradley, "Field Artillery Doctrine: Does it Support Maneuver Warfare," (Fort Leavenworth, KS: United States Army Command and General Staff College, 1988), p. 2.

⁶⁹ U.S. Army National Training Center Field Artillery Trainers, [Http://www.irwin.army.mil/Wolf/pages](http://www.irwin.army.mil/Wolf/pages)

⁷⁰ Part of that decline is attributable to NTC's shift from a battalion level to brigade level operations model. Under the battalion model, the unit's organic mortars, and all three firing batteries of the direct support artillery battalion were available for support. In the brigade model, there is one direct support artillery battalion and a reinforcing artillery battalion (usually rockets, but sometimes cannons) along with organic mortars available to the maneuver commander.

⁷¹ Interview of Lieutenant General James T. Hill, Commanding General of I Corps and Fort Lewis, Washington by Patrecia Slayden Hollis, Proactive Artillery for Fast Responsive Fires" Field Artillery Journal, Vol. VI, No. 2, March-April 2001, p.4.

⁷² Ibid. Author's personal knowledge. Lieutenant Colonel Mike Defferding commanded 2-11 Field Artillery during their JRTC rotation where he achieved a 75% call-for-fire to contact rate. The author used Colonel Defferding's technique to train in the close fight and achieved a 87% call for contact rate. The highest in JRTC's history. To date, this mark has not been passed.

⁷³ BG Huba Wass de Czege, "Improving the Demand Side of Fire Support," Military Review (November 1993), p.42

⁷⁴ BG Huba Wass de Czege, "Improving the Demand Side of Fire Support," Military Review (November 1993), p.41.

⁷⁵ Ibid, p.43.

⁷⁶ Ibid, p. 53.

⁷⁷ Lieutenant Colonel Robert R. Leonhard, "Classical Fire Support vs. Parallel Fires", Army Magazine, Volume 51, April 2001, No. 4, p. 47

⁷⁸ Ibid, p.48.

⁷⁹ Ibid, p.48

⁸⁰ Ibid, p.49

⁸¹ Ibid, p.50.

⁸² Interview of Lieutenant General James T. Hill, Commanding General of I Corps and Fort Lewis, Washington by Patrecia Slayden Hollis, Proactive Artillery for Fast Responsive Fires" Field Artillery Journal, Vol. VI, No. 2, March-April 2001, p.4.

⁸³ Ibid, pp.4-5.

⁸⁴ Ibid, p.5.

⁸⁵ Major General Carl F. Ernst, "Is The FA Walking Away from the Close Fight?" Field Artillery Journal, Vol. IV, No. 5, September-October 1999, p.8.

⁸⁶ Ibid, pp. 9-11.

⁸⁷ Basically, what happens is the target receives indirect fires in sequence from the largest indirect fire weapon down to the smallest while the maneuver forces move behind what amounts to a rolling barrage. Example, 155mm artillery fires impacting on the target allows the infantry to safely close to within 500 meters. Next, 105mm artillery fires would begin impacting, the 155mm stopping, this allows the infantry to advances safely to within 400 meters. The sequence is continued with 81mm and 60mm mortars, then on to the 40mm grenade launcher. If successful, the infantry formation has moved to within 100 meters of the target before having to conduct fire and movement with direct fire weapons.

⁸⁸ Interview of General John N. Abrams, Commanding General of the Training and Doctrine Command by Patrecia Slayden Hollis, *The Role of the FA and Fire Support In Transition*, Field Artillery Journal, Vol. VI, No. 1, January-February 2001, p6.

⁸⁹ Ibid, p.7.

⁹⁰ Ibid, p7.

⁹¹ Brigadier General William F. Engel, "Report to the Field: Tactical/Operational Fire Support Conference." Field Artillery Journal, Vol. V, No. 3, May-June 2000, p.31

⁹² Carl F. Ernst, "Is the FA Walking Away From The Close Fight." Field Artillery Journal, Vol. IV, No. 5 September-October 1999,

⁹³ Engel, p.31.

⁹⁴ Ibid, p.31.

⁹⁵ Ibid, p.31.

⁹⁶ Brigadier General William F. Engel, "Report to the Field: Tactical/Operational Fire Support Conference." Field Artillery Journal, Vol. V, No. 3, May-June 2000, *p.35*

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